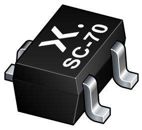


PMF370XN

N-channel TrenchMOS extremely low level FET

5 July 2019 | Product data sheet

1. General description

Extremely low level N-channel enhancement mode Field-Effect Transistor (FET) in a plastic package using TrenchMOS technology. This product is designed and qualified for use in computing, communications, consumer and industrial applications only.

2. Features and benefits

- Low conduction losses due to low on-state resistance
- Low threshold voltage
- Saves PCB space due to small footprint (40 % smaller than SOT23)
- Suitable for low gate drive sources
- Surface-mounted package

3. Applications

- Driver circuits
- Switching in portable appliances

4. Quick reference data

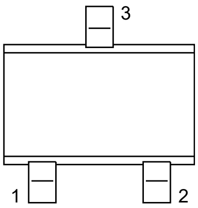
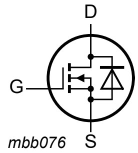
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DS}	drain-source voltage	25 °C ≤ T_j ≤ 150 °C		-	-	30	V
I_D	drain current	V_{GS} = 4.5 V; T_{sp} = 25 °C		-	-	0.87	A
P_{tot}	total power dissipation	T_{sp} = 25 °C		-	-	0.56	W
Static characteristics							
R_{DSon}	drain-source on-state resistance	V_{GS} = 4.5 V; I_D = 0.2 A; T_j = 25 °C		-	370	440	mΩ

nexperia

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	G	gate	 **SC-70 (SOT323)**	
2	S	source		
3	D	drain		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMF370XN	SC-70	plastic surface-mounted package; 3 leads	SOT323

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PMF370XN	F6%

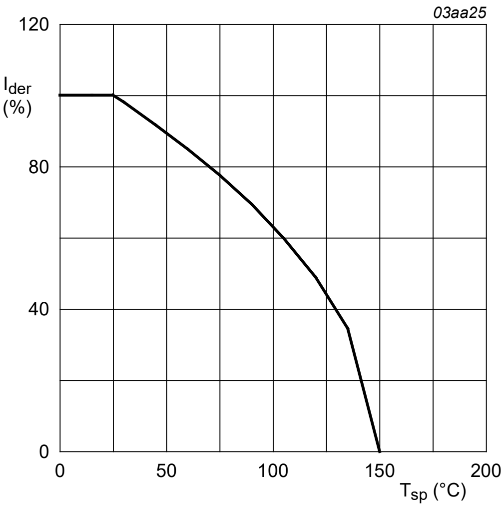
[1] % = placeholder for manufacturing site code

8. Limiting values

Table 5. Limiting values

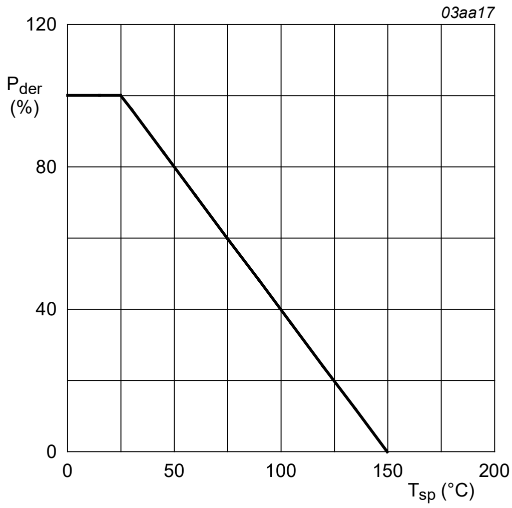
In accordance with the Absolute Maximum Rating System (IEC 60134)

Symbol	Parameter	Conditions		Min	Max	Unit
V_{DS}	drain-source voltage	25 °C ≤ T_j ≤ 150 °C		-	30	V
V_{DGR}	drain-gate voltage	25 °C ≤ T_j ≤ 150 °C; R_{GS} = 20 kΩ		-	30	V
V_{GS}	gate-source voltage			-12	12	V
I_D	drain current	V_{GS} = 4.5 V; T_{sp} = 25 °C		-	0.87	A
		V_{GS} = 4.5 V; T_{sp} = 100 °C		-	0.55	A
I_{DM}	peak drain current	T_{sp} = 25 °C; pulsed; t_p ≤ 10 µs		-	1.74	A
P_{tot}	total power dissipation	T_{sp} = 25 °C		-	0.56	W
T_j	junction temperature			-55	150	°C
T_{stg}	storage temperature			-55	150	°C
I_S	source current	T_{sp} = 25 °C		-	0.47	A
I_{SM}	peak source current	pulsed; t_p ≤ 10 µs; T_{sp} = 25 °C		-	0.94	A



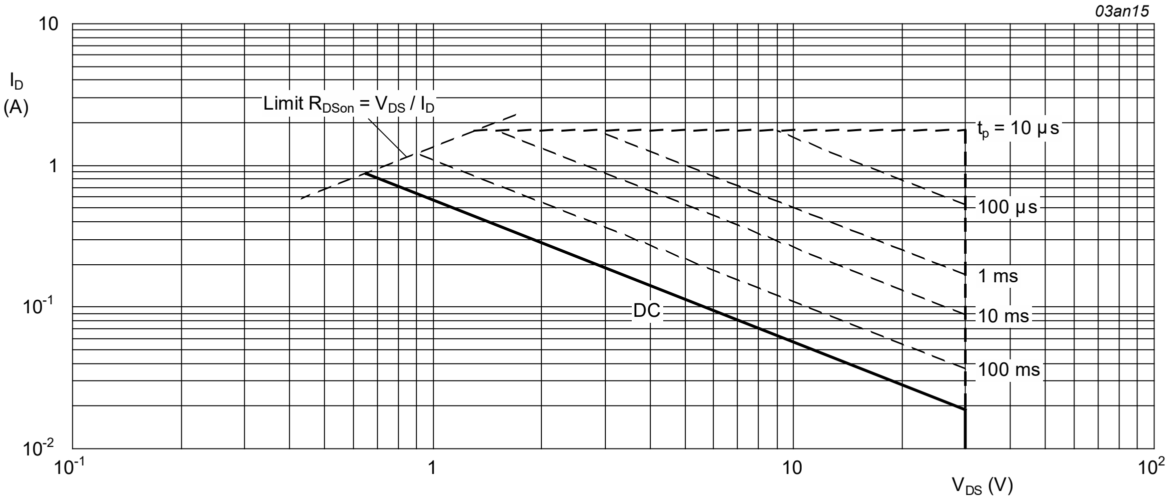
$$I_{der} = \frac{I_D}{I_{D(25°C)}} \times 100\,\%$$

Fig. 1. Normalized continuous drain current as a function of solder point temperature



$$P_{der} = \frac{P_{tot}}{P_{tot(25°C)}} \times 100\,\%$$

Fig. 2. Normalized total power dissipation as a function of solder point temperature



$T_{sp} = 25°C$; I_{DM} is single pulse; $V_{GS} = 4.5V$

Fig. 3. Safe operating area; continuous and peak drain currents as a function of drain-source voltage

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	220	K/W

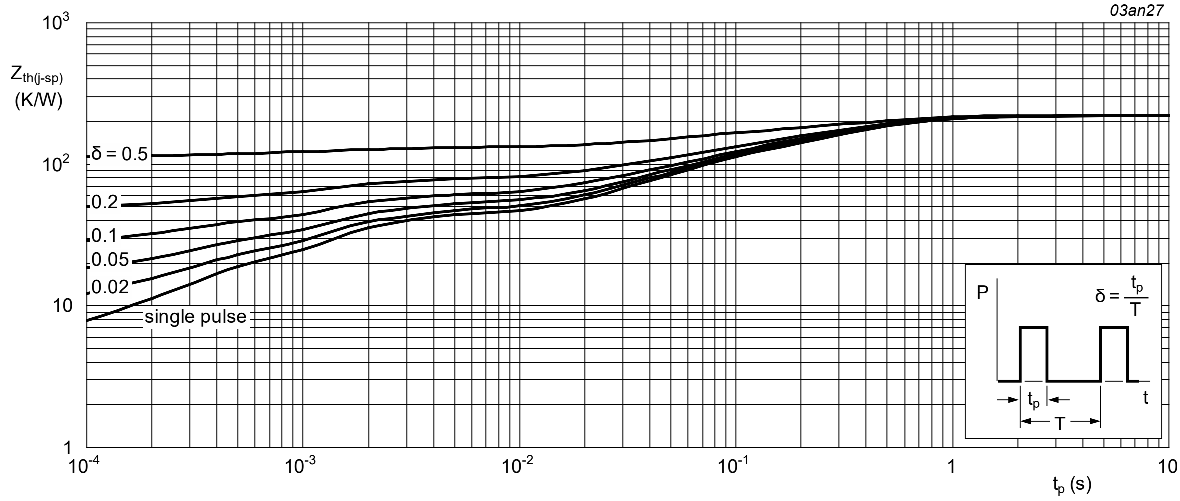
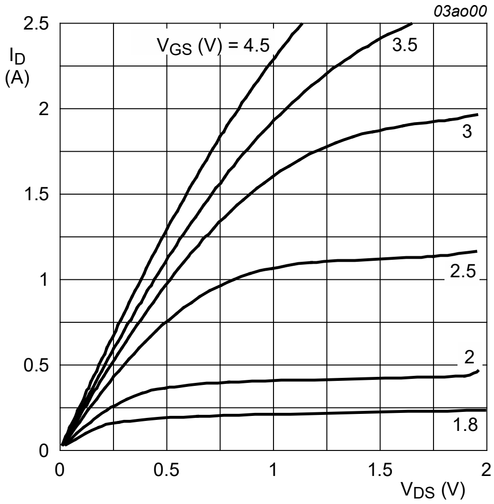


Fig. 4. Transient thermal impedance from junction to solder point as a function of pulse duration

10. Characteristics

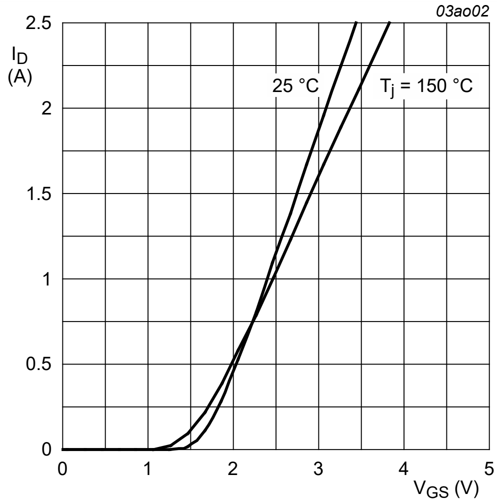
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
$V_{(BR)DSS}$	drain-source breakdown voltage	I_D = 250 μA; V_{GS} = 0 V; T_j = -55 °C		27	-	-	V
		I_D = 250 μA; V_{GS} = 0 V; T_j = 25 °C		30	-	-	V
V_{GSth}	gate-source threshold voltage	I_D = 250 μA; V_{DS} = V_{GS}; T_j = -55 °C		-	-	1.8	V
		I_D = 250 μA; V_{DS} = V_{GS}; T_j = 150 °C		0.35	-	-	V
		I_D = 250 μA; V_{DS} = V_{GS}; T_j = 25 °C		0.5	1	1.5	V
I_{DSS}	drain leakage current	V_{DS} = 30 V; V_{GS} = 0 V; T_j = 25 °C		-	-	1	μA
		V_{DS} = 30 V; V_{GS} = 0 V; T_j = 70 °C		-	-	2	μA
		V_{DS} = 30 V; V_{GS} = 0 V; T_j = 150 °C		-	-	10	μA
I_{GSS}	gate leakage current	V_{GS} = 12 V; V_{DS} = 0 V; T_j = 25 °C		-	10	100	nA
		V_{GS} = -12 V; V_{DS} = 0 V; T_j = 25 °C		-	10	100	nA
R_{DSon}	drain-source on-state resistance	V_{GS} = 2.5 V; I_D = 0.1 A; T_j = 25 °C		-	550	650	mΩ
		V_{GS} = 4.5 V; I_D = 0.2 A; T_j = 150 °C		-	629	748	mΩ
		V_{GS} = 4.5 V; I_D = 0.2 A; T_j = 25 °C		-	370	440	mΩ
Dynamic characteristics							
$Q_{G(tot)}$	total gate charge	V_{DS} = 15 V; I_D = 1 A; V_{GS} = 4.5 V; T_j = 25 °C		-	0.65	-	nC
Q_{GS}	gate-source charge			-	0.14	-	nC
Q_{GD}	gate-drain charge			-	0.18	-	nC
C_{iss}	input capacitance	V_{DS} = 25 V; f = 1 MHz; V_{GS} = 0 V; T_j = 25 °C		-	37	-	pF
C_{oss}	output capacitance			-	8.5	-	pF
C_{rss}	reverse transfer capacitance			-	5.5	-	pF
$t_{d(on)}$	turn-on delay time	V_{DS} = 15 V; R_L = 15 Ω; V_{GS} = 4.5 V; $R_{G(ext)}$ = 6 Ω; T_j = 25 °C		-	6.5	-	ns
t_r	rise time			-	9.5	-	ns
$t_{d(off)}$	turn-off delay time			-	14	-	ns
t_f	fall time			-	5.5	-	ns
Source-drain diode							
V_{SD}	source-drain voltage	I_S = 0.3 A; V_{GS} = 0 V; T_j = 25 °C		-	0.81	1.2	V



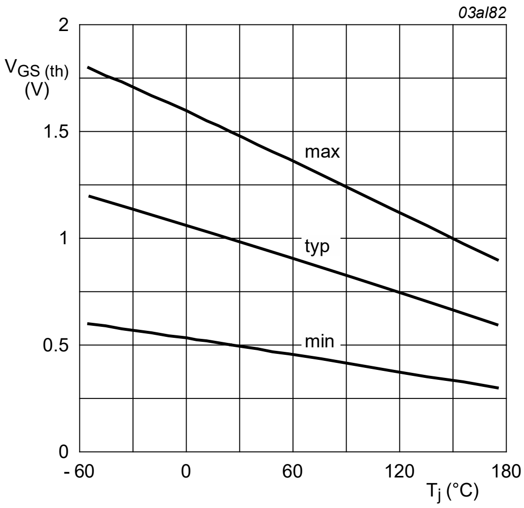
T_j = 25 °C

Fig. 5. Output characteristics: drain current as a function of drain-source voltage; typical values



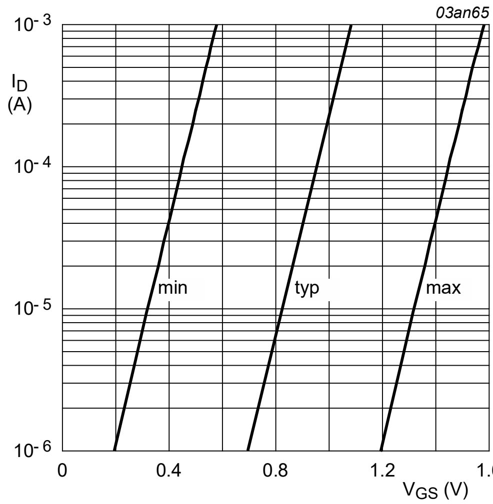
T_j = 25 °C and 150 °C; $V_{DS} > I_D \times R_{DSon}$

Fig. 6. Transfer characteristics: drain current as a function of gate-source voltage; typical values



$I_D = 0.25A; V_{DS} = V_{GS}$

Fig. 7. Gate-source threshold voltage as a function of junction temperature



$T_j = 25°C; V_{DS} = 5V$

Fig. 8. Subthreshold drain current as a function of gate-source voltage

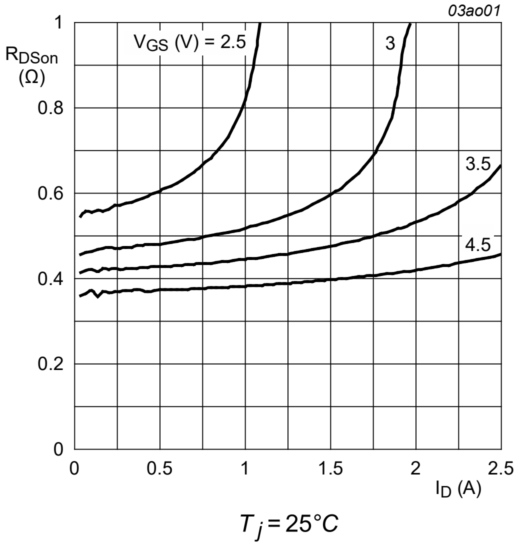


Fig. 9. Drain-source on-state resistance as a function of drain current; typical values

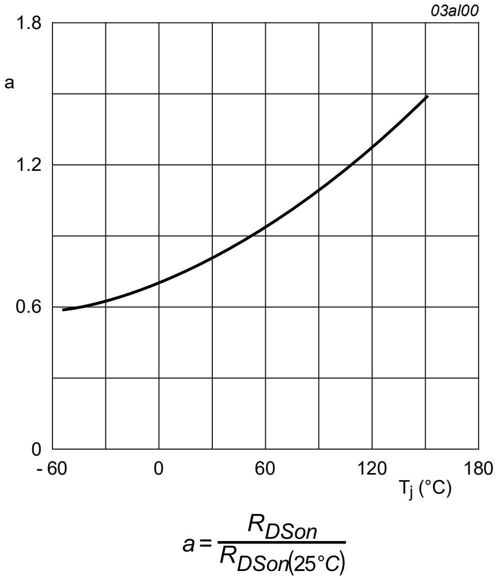


Fig. 10. Normalized drain-source on-state resistance factor as a function of junction temperature

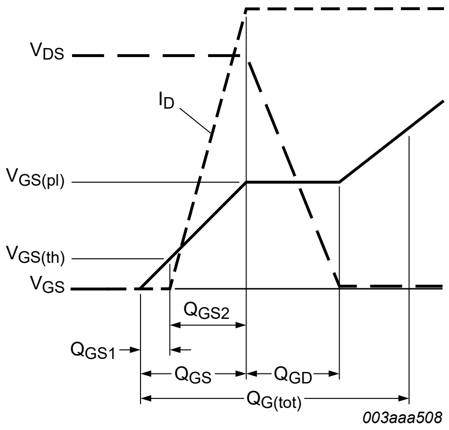


Fig. 11. Gate charge waveform definitions

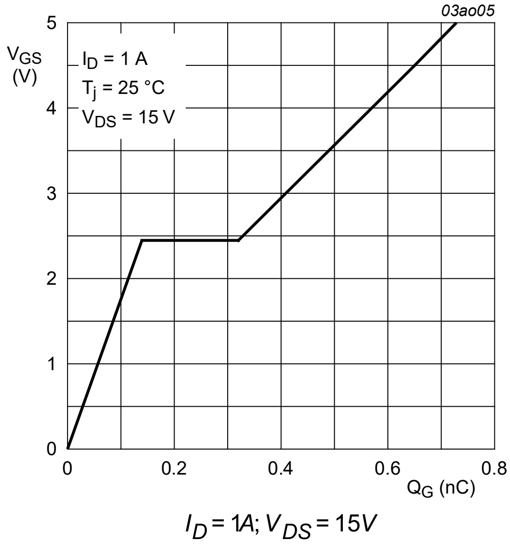
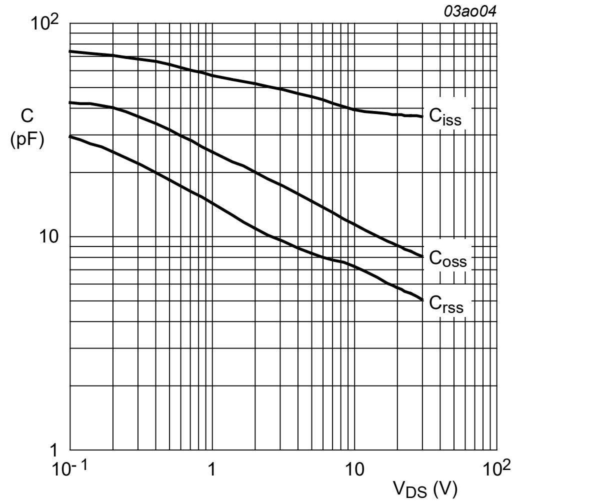
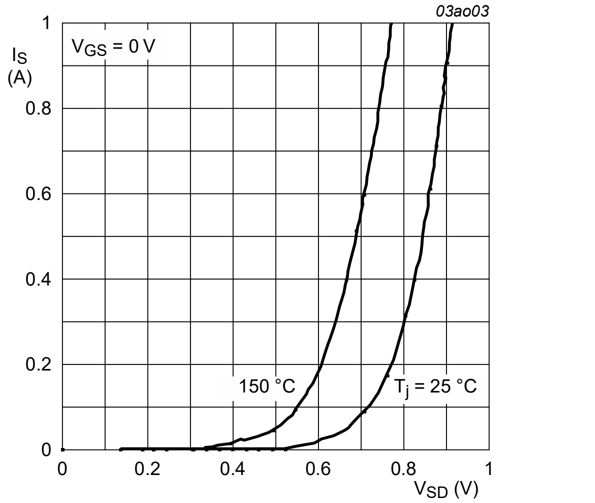


Fig. 12. Gate-source voltage as a function of gate charge; typical values



V_{GS} = 0 V; 1 MHz

Fig. 13. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

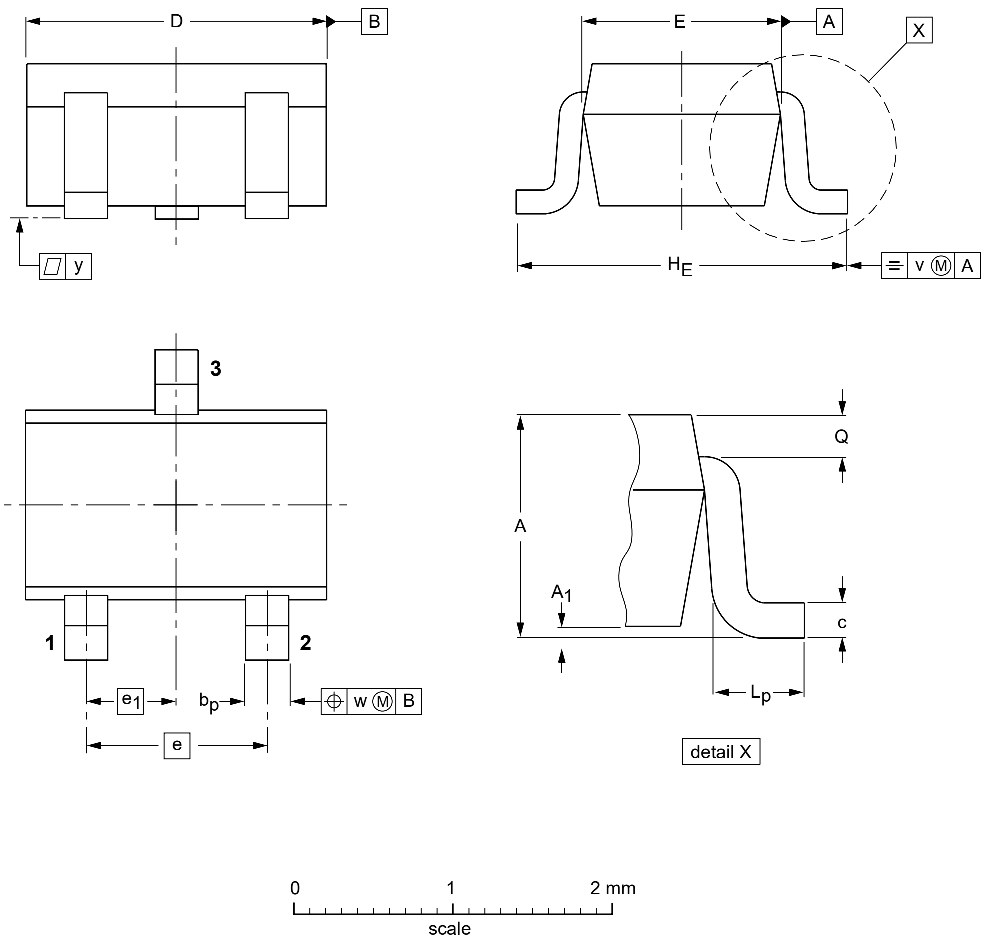


T_j = 25 °C and 150 °C; V_{GS} = 0 V

Fig. 14. Source current as a function of source-drain voltage; typical values

11. Package outline

Plastic surface-mounted package; 3 leads SOT323



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	1.1 0.8	0.1	0.4 0.3	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.23 0.13	0.2	0.2

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT323			SC-70			~~04-11-04~~ 06-03-16

Fig. 15. Package outline SC-70 (SOT323)

12. Soldering

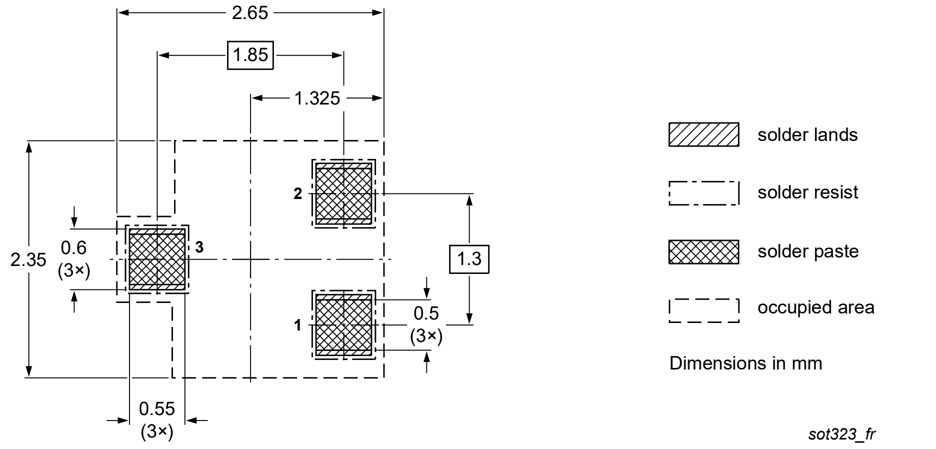


Fig. 16. Reflow soldering footprint for SC-70 (SOT323)

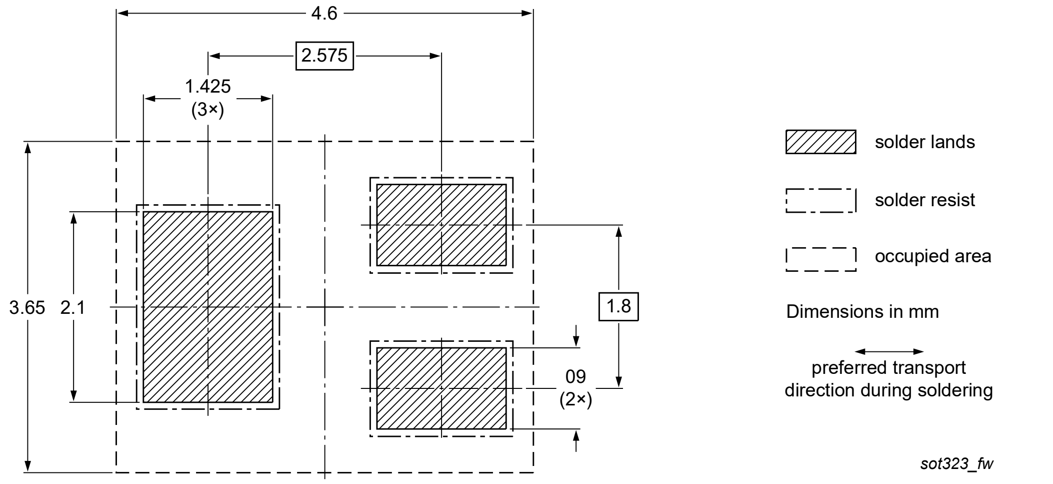


Fig. 17. Wave soldering footprint for SC-70 (SOT323)

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMF370XN v.4	20190705	Product data sheet	-	PMF370XN v.3
Modifications:	• Measurement conditions for $V_{(BR)DSS}$ revised. • Legal texts have been adapted to the new company name where appropriate. • The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.			
PMF370XN v.3	20080620	Product data sheet	-	PMF370XN v.2
PMF370XN v.2	20051206	Product data sheet	-	PMF370XN v.1
PMF370XN v.1	20040211	Product data sheet	-	-

14. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at https://www.nexperia.com.

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Contents

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For sales office addresses, please send an email to: salesaddresses@nexperia.com
Date of release: 5 July 2019

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- Поставка более 17-ти миллионов наименований электронных компонентов;
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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

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